Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-14 (cancelled)

15. (new) A method of generating a hybrid grid applicable to a heterogeneous medium crossed by at least one geometric discontinuity of known geometry, in order to form a model representative of fluid flows in the medium in accordance with a defined numerical pattern, structure of the medium being known a priori from available data acquired through in-situ measurements, analyses and/or interpretations of images of the medium, comprising:

forming a hybrid grid including at least one first structured grid for gridding of at least part of the medium;

forming at least one second structured grid for gridding of another part of the medium;

forming at least one cavity between the at least one first structured grid and each at least one second structured grid with a sufficient size to allow formation of at least one unstructured grip providing transition between the structured grids; and

forming each unstructured grid which provides transition by means of a power diagram and by imposing conformity of each unstructured grid providing transition with walls of each cavity.

16. (new) A method as claimed in claim 15, wherein:

the at least one geometric discontinuity is a pipe or a well of known geometry crossing the medium, and a radial type grid is formed around each well or pipe, each cavity being defined around each second structured radial grid by deactivating grid cells of the first structured grid.

17. (new) A method as claimed in claim 15, wherein:

at least one geometric discontinuity is a fracture or a fault crossing the heterogeneous medium and a first structured grid and a second structured grid are formed in parts of the heterogeneous medium, on either side of each fracture, by considering the discontinuities thereof, each cavity including a unstructured transition grid formed by deactivating grid cells of the first and second structured grids, on either side of each fracture.

18. (new) A method as claimed in claim 16, wherein:

at least one geometric discontinuity is a fracture or a fault crossing the heterogeneous medium and a first structured grid and a second structured grid are formed in parts of the heterogeneous medium, on either side of each fracture, by considering the discontinuities thereof, each cavity including a unstructured transition grid formed by deactivating grid cells of the first and second structured grids, on either side of each fracture.

19. (new) A method as claimed in claim 15, comprising:

imposing polygonal edges forming of walls of each cavity to be edges of a Delaunay type triangulation.

20. (new) A method as claimed in claim 16, comprising:

imposing polygonal edges forming the walls of each cavity to be edges of a Delaunay type triangulation.

21. (new) A method as claimed in claim 17, comprising:

imposing polygonal edges forming the walls of each cavity to be edges of a Delaunay type triangulation.

22. (new) A method as claimed in claim 18, comprising:

imposing polygonal edges forming the walls of each cavity to be edges of a Delaunay type triangulation.

23. (new) A method of simulating, in accordance with a defined numerical pattern, evolution of a process in a heterogeneous medium crossed by at least one geometric discontinuity of known geometry, structure of the medium being known a priori from available data acquired through in-situ measurements, analyses and/or interpretations of images of the medium, comprising:

forming a hybrid grid including at least one first structured grid for gridding of at least part of the medium;

forming at least one second structured grid for gridding of another part of the medium;

forming at least one cavity between the at least one first structured grid and each at least one second structured grid with a sufficient size to allow

formation of at least one unstructured grip providing transition between the structured grids;

forming the at least one unstructured grid providing transition by using power diagrams and imposing conformity of each unstructured grid providing transition with walls of each cavity; and

solving the numerical pattern in the hybrid grid formed for the medium.

24. (new) A method as claimed in claim 15, wherein:

each first structured grid is a non-regular grid, of CPG type.

25. (new) A method as claimed in claim 16, wherein:

each first structured grid is a non-regular grid, of CPG type.

26. (new) A method as claimed in claim 17, wherein:

each first structured grid is a non-regular grid, of CPG type.

27. (new) A method as claimed in claim 18, wherein:

each first structured grid is a non-regular grid, of CPG type.

28. (new) A method as claimed in claim 19, wherein:

each first structured grid is a non-regular grid, of CPG type.

29. (new) A method as claimed in claim 20, wherein:

each first structured grid is a non-regular grid, of CPG type.

30. (new) A method as claimed in claim 21, wherein:

each first structured grid is a non-regular grid, of CPG type.

31. (new) A method as claimed in claim 22, wherein:

each first structured grid is a non-regular grid, of CPG type.

32. (new) A method as claimed in claim 23, wherein:

each first structured grid is a non-regular grid, of CPG type.

33. (new) A method in accordance with claim 23, wherein:

the evolution of the process involves fluid flows.

34. (new) A method in accordance with claim 24, wherein:

the evolution of the process involves fluid flows.